Operant conditioning

Psychology 248

Prof. Benjamin

Operant vs. classical conditioning

Classical: relationship between stimuli (CS and US) is important, and predicts a response (UR)

Operant: relationship between stimuli (condition) and response is important, and predicts a stimulus (reinforcer)

Selective reinforcement

http://www.youtube.com/watch?v=guroaQRFsX4

What is learned?

Thorndike's puzzle boxes

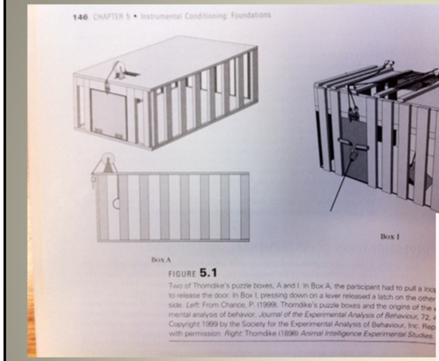

146 CHAPTER 5 • Instrumental Conditioning: Foundations

FIGURE **5.1**

Two of Thorndike's puzzle boxes, A and I. In Box A, the participant had to pull a loo
to release the door. In Box I, pressing down on a lever released a latch on the other
side. *Left:* From Chance, P. (1999). Thorndike's puzzle boxes and the origins of the
mental analysis of behavior. *Journal of the Experimental Analysis of Behaviour*, 72,
Copyright 1999 by the Society for the Experimental Analysis of Behaviour, Inc. Rep
with permission. *Right:* Thorndike (1898) *Animal Intelligence Experimental Studies.*

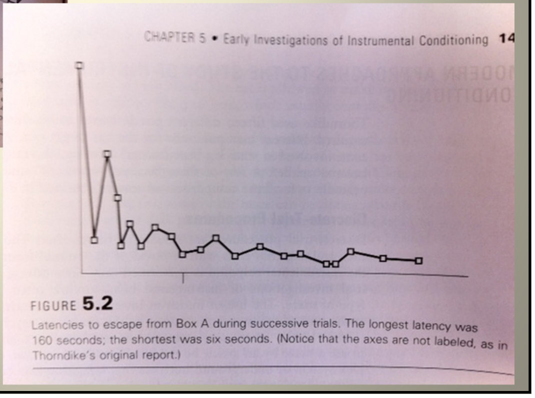

CHAPTER 5 • Early Investigations of Instrumental Conditioning 14

FIGURE **5.2**

Latencies to escape from Box A during successive trials. The longest latency was 160 seconds; the shortest was six seconds. (Notice that the axes are not labeled, as in Thorndike's original report.)

Types of reinforcement

Procedure	Contingency	Result on behavior
[1] Positive reinforcement	Response yields appealing outcome	Increase in response
[2] Punishment	Response yields aversive outcome	Decrease in response
[3] Negative reinforcement	Response prevents aversive outcome	Increase in response
[4] Omission training	Response prevents appealing outcome	Decrease in response

Omission training for self-injurious behavior

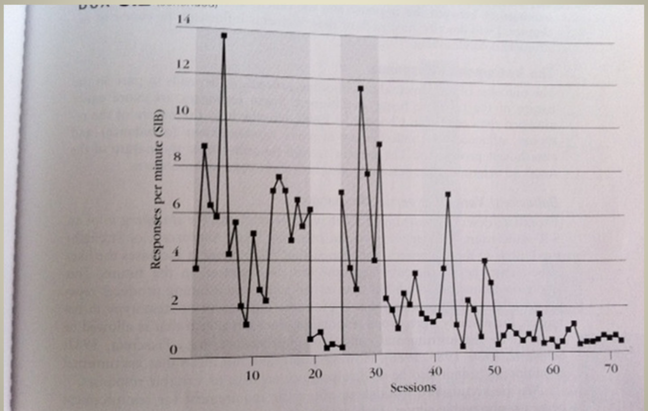
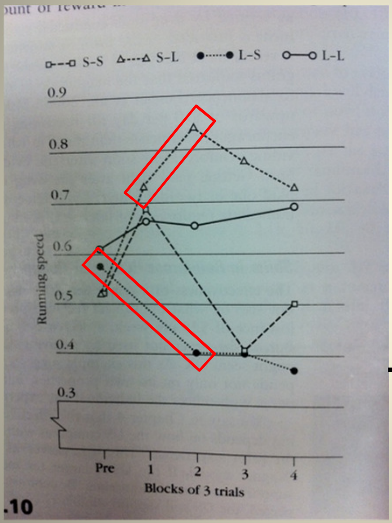


FIGURE 5.7
Rate of Bridget's self-injurious behavior during baseline sessions (1–19, and 25–31) and during sessions which a DRO contingency was in effect (20–24, and 32–72). (From Lindberg et al., 1999.)

Lindberg, Iwata, Kahng, & DeLeon (1999)

What is associated?



stimulus

response

reinforcer

Mellgren (1972)

What is associated?

Light + Lever press → sugar water
Tone + Lever press → food

--now satiate the rat on sugar water

Rat continues to press lever in presence of tone but not light!

Colwill and Delamater (1995)

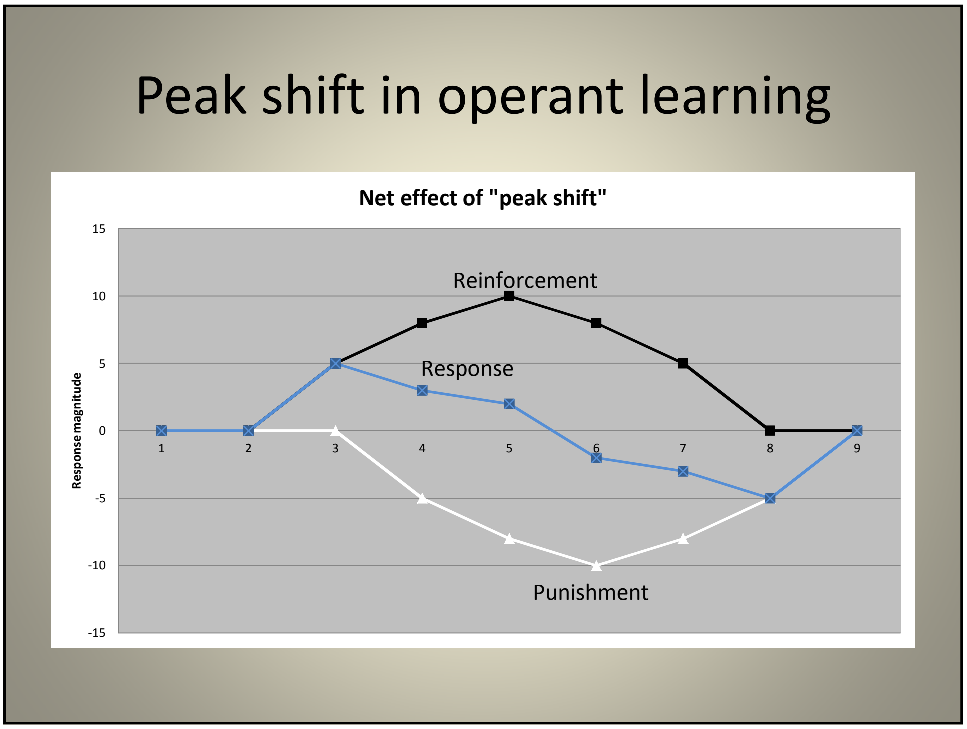
stimulus

response

reinforcer

Nature of the reinforcer

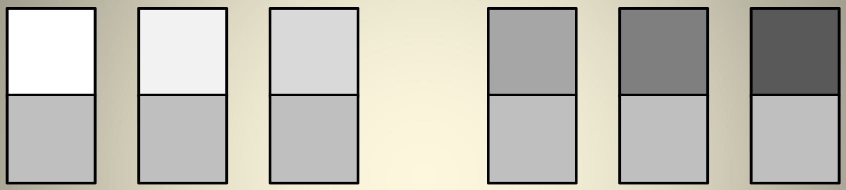
- Reinforcer can be neutral (St. Claire-Smith & MacLaren, 1983)
  - Rats learn [1] Lever press → noise
  - And then later are classically conditioned:
    - [2] Noise (US) → Food (CS)
    - [3] Light (US) → Food (CS)
  - Group [2] presses lever more later.
- Reinforcer can be secondary
  - First learn [2], then [1]
  - Rat will press the lever just for the noise (Skinner, 1938)



Peak shift in operant learning

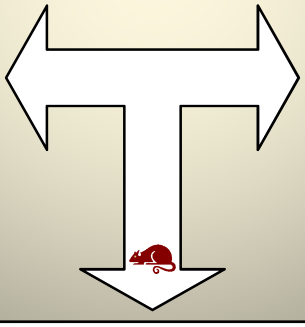
Relational responding

Training:



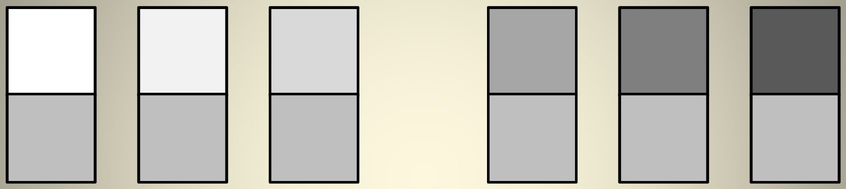
turn left

turn right



Relational responding

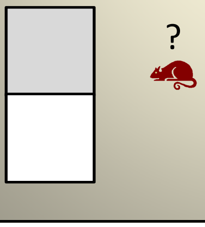
Training:



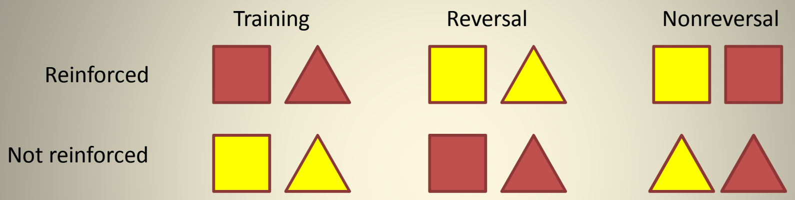
turn left

turn right

Test:



Dimensional learning



Which is easier, *reversal* shift, or *nonreversal* shift?

Shaping

http://www.youtube.com/watch?v=drnnulHw5CM

Contiguity vs. contingency

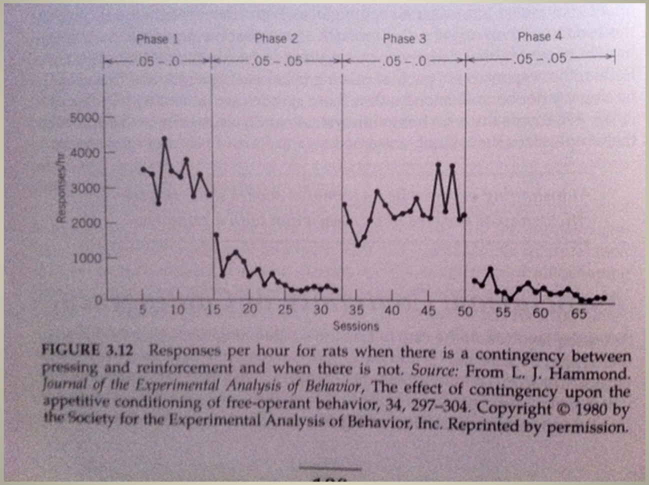


FIGURE 3.12 Responses per hour for rats when there is a contingency between pressing and reinforcement and when there is not. *Source:* From L. J. Hammond. *Journal of the Experimental Analysis of Behavior*, The effect of contingency upon the appetitive conditioning of free-operant behavior, 34, 297–304. Copyright © 1980 by the Society for the Experimental Analysis of Behavior, Inc. Reprinted by permission.

Contingency in human learning

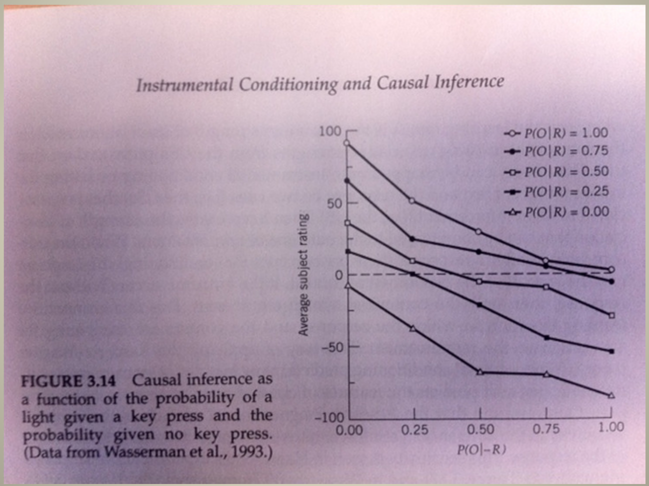
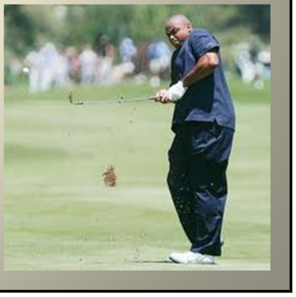

Instrumental Conditioning and Causal Inference

FIGURE 3.14 Causal inference as a function of the probability of a light given a key press and the probability given no key press. (Data from Wasserman et al., 1993.)

Partial reinforcement

- *Partial reinforcement extinction* effect
- Kids do more work in school following partial than full reinforcement (Eisenberger, Heerdt, Hamdi, Zimet, & Bruckmeir, 1979)



Learned helplessness

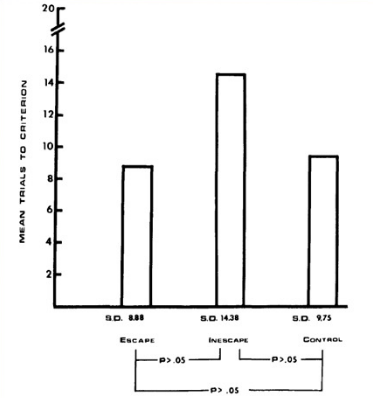


FIGURE 9. Group means, standard deviations, and significance levels of three dependent variables for the instrumental pretreatment-cognitive test for helplessness experiment: mean trials to criterion for anagram solution.

Hiroto & Seligman (1975)

Next class:
Transient forms of memory